State Geological Survey Division

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Illinois Department of
Energy and Natural Resources

September 8, 1983

Mr. Lawrence W. Eastep, P.E.
Manager, Permit Section
Division of Land Pollution Control
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62706

Dear Mr. Eastep:

This is in response to your request for a preliminary hydrogeologic evaluation of the storage pond area at Amoco Oil Company's Wood River Refinery and a review of the subsurface investigation that was supplied by the company's consultants. The location of the site was incorrectly given as the NE¼ Section 33 and the SE¼ Section 28, T. 5 N., R. 5 W., Madison County. The storage ponds, as shown on the U.S.G.S. Wood River quadrangle map, are located in T. 5 N., R. 9 W., Madison County. No visit was made to this site.

First, let me answer your questions. You were concerned that the site is west of the levee and could be subject to flooding. This appears to be the case, as the engineering report points out. The site is not over an active mine shaft or within 2 miles of an active fault. However, an earthquake of intensity VI on the Modified Mercalli scale was reported in the area in 1953. The epicenter of this earthquake was in Section 32, T. 4 N., R. 9 W., Madison County.

I have thoroughly reviewed the Mathes report and basically agree with its conclusions. I believe that the reference to the shallow groundwater as being "perched" to be misleading because the shallow aquifer is quite extensive and is everywhere underlain by a clayey material which separates it from another sand aquifer below. The water levels in the shallow piezometers are important because, when compared to the values for the deeper piezometers, they indicate a downward vertical gradient.

In general, sand was encountered in the borings at depths of at least 35 feet. This would make the sight marginal for waste disposal. However, sand seams were encountered in borings 2 and 18 as shallow as 15 feet. In addition, the majority of the lab hydraulic conductivities were greater than 10^{-4} and several field hydraulic conductivities were greater than 10^{-3}. These values are very high for a waste disposal site, but there was only one sample tested from a depth greater than 20 feet. It had a lab hydraulic conductivity of about 10^{-6}.

In conclusion, the probability of groundwater contamination from hazardous waste storage ponds at the Wood River Refinery is very high. The main question in acceptability of this site seems to be whether the chemfix process will render the waste inert, as the engineers claim. If the chemfix process will allow classification of this site as Class IV, the site may be a suitable waste disposal location.

If I can be of further assistance, please let me know.

Sincerely,

Beverly L. Herzog

Beverly L. Herzog
Assistant Geologist
Hydrogeology and Geophysics Section

BLH:brl